Nova Scotia

ANNUAL REPORT

for the fiscal year
ending March 31, 1985

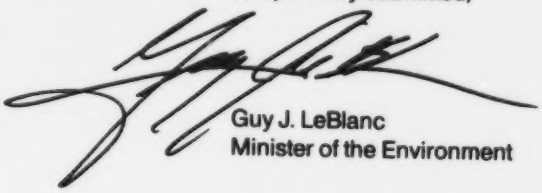
Department of the Environment

The Honourable Alan R. Abraham, C.D.
Lieutenant Governor
Province of Nova Scotia

May It Please Your Honour:

The undersigned has the privilege to present to Your Honour the Annual Report of the Nova Scotia Department of the Environment for the fiscal year ending March 31, 1985.

Respectfully submitted,



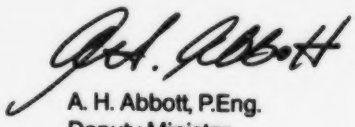
Guy J. LeBlanc
Minister of the Environment

The Honourable Guy J. LeBlanc
Minister of the Environment
Province of Nova Scotia

Sir:

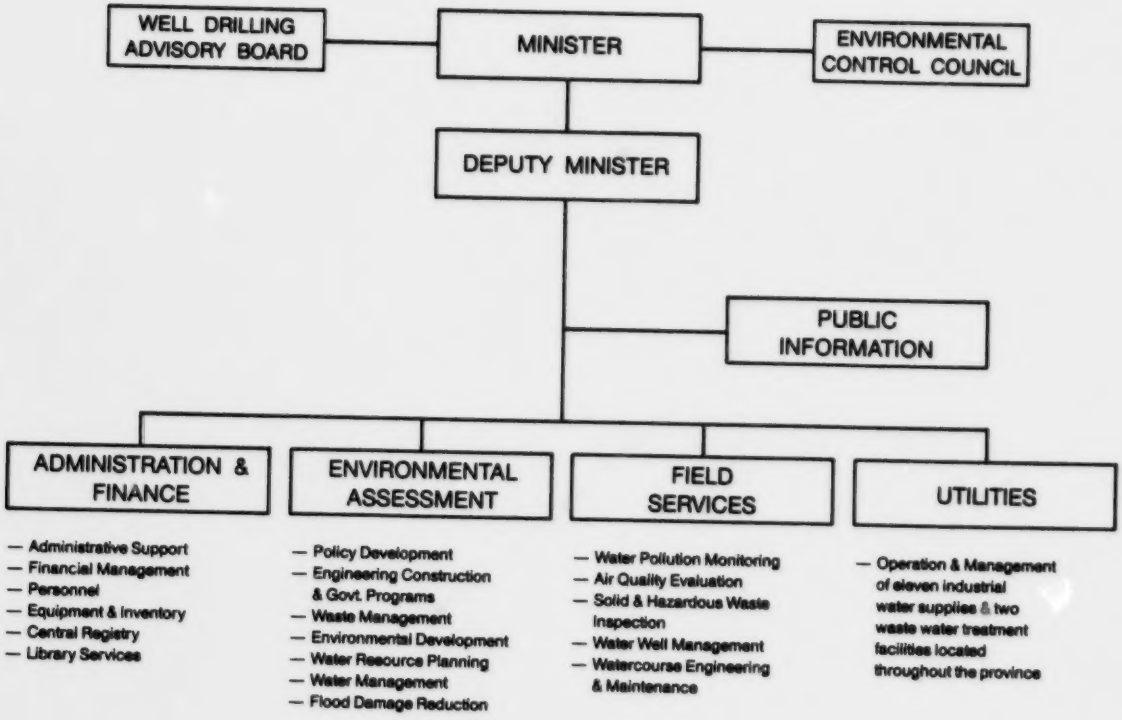
I have the honour to present to you the report of the activities of the Nova Scotia Department of the Environment for the fiscal year ending March 31, 1985.

Respectfully submitted,



A. H. Abbott, P.Eng.
Deputy Minister

DEPARTMENT OF THE ENVIRONMENT
ORGANIZATION 1984-85



CONTENTS

Introduction 9

Environmental Assessment Division
Waste Management 10
Solid and Hazardous Waste Management 10
Industrial Pollution Control 10

Engineering Construction and Government Programs 11

Environmental Development 12
Pesticides Management 12
Environmental Review 13
Environmental Studies 14

Water Resources Planning 15
Water Resource Services 15
Water Resources Inventory 17

Water Management 18

Field Services Division
Solid and Hazardous Waste Inspection 20
Air Quality Evaluation 21
Water Pollution Control Monitoring 21
Water Well Management 22
Watercourse Engineering and Maintenance 23

Utilities Division 26

Administration and Finance Division 27

General
Environmental Control Council 28
Advisory Groups 28
Canada-Nova Scotia Flood Damage Reduction Program 29
Environmental Emergencies 29
Grants Program 30
Meetings, Committees, Education and Technical Seminars 30
Public Information and Education Programs 32
Publications and Outside Contributions 33

Tables

Table 1—Written Responses — Water Resources 34
Table 2—Hydrometric Network Data User Survey 34
Table 3—Air Pollution Monitoring Facilities 35
Table 4—Air Pollution Inquiries 36
Table 5—Water Pollution Control Facilities 37
Table 6—Water Well Drilling in Nova Scotia 38
Table 7—Stream Bank Protection and Maintenance Program 39

INTRODUCTION

The Nova Scotia Department of the Environment was established by the Environmental Protection Act in 1973 for the "preservation and protection of the environment."

To carry out these responsibilities the department is currently divided into four divisions. These include three operating divisions: Environmental Assessment, Field Services, and Utilities. Administration and Finance provides support services to the operating divisions and to the office of the Minister and Deputy Minister. The department administers four pieces of legislation: the Environmental Protection Act; the Water Act; the Well Drilling Act, and the Beverage Containers Act.

The department's head office is located in Halifax. Regional offices are located in Middleton, Pictou, Port Hawkesbury, Stellarton, Sydney, and Truro.

ENVIRONMENTAL ASSESSMENT DIVISION

The Environmental Assessment Division, the largest operating division in the department, has two main areas of responsibility: environmental review and assessment of projects and programs within the province; and water resources management for optimal development and protection of the resource.

This division also includes the Canada-Nova Scotia Flood Damage Reduction Program and advisory services for department policy development.

The division is divided into five sections: Waste Management, Engineering Construction and Government Programs, Environmental Development, Water Resources Planning, and Water Management.

Waste Management

This section has two major areas of responsibility.

Solid and Hazardous Waste Management. Technical assistance and procedural guidance on acceptable methods for the disposal of solid and hazardous waste were extended to municipalities and industry. In addition, grants were provided to municipalities for the planning of solid waste management systems. Since the inception of the grants program in 1975, 11 waste management systems, serving 60 per cent of the population, have been established. Ten of the facilities are sanitary landfills, and one is a forced draft incinerator.

During the year, 201 abandoned waste disposal sites were identified and categorized. Fifteen were classified as "priority one" sites, having a high potential for environmental problems.

Industrial Pollution Control. Procedural guidance is provided to industries to ensure compliance with departmental regulations, guidelines, permit requirements, and other provincial and federal statutes. The environmental impact of proposed projects is assessed and pollution abatement facilities are evaluated.

Major projects carried out during the fiscal year include the following.

(1) Sydney Steel Corporation. An investigation into the coal tar contamination of Muggah Creek in Sydney was completed during the year. A management strategy was developed for pollution control of the Sydney Tar Pond.

(2) Municipal Water Supplies. Investigations were carried out to determine the sources of chlorinated solvent contamination in two municipal water supplies.

(3) Fish Wastes. Disposal guidelines were developed, along with a permit approval process covering land disposal of fish wastes, to mitigate the impact of indiscriminate disposal.

(4) Esso Refinery. A permit was issued to the Esso refinery in Dartmouth for a major upgrading of their landfill operation.

(5) Dry Cleaning Industry. A province-wide survey of dry cleaning establishments was conducted, and guidelines were established to control the disposal of wastes containing perchloroethylene (PCE).

(6) Cape Breton Development Corporation. Work continued on the assessment and development of waste management strategies for a number of major projects, including the Donkin and Lingan-Phalen coal mines, the Lifting-Banking Centre, and the Prince Mine coal preparation plant. In addition, efforts were made to correct an effluent control problem at Victoria Junction.

(7) Gold Mining. Six prospective gold mining ventures, involving some 32 sites, were assessed, and procedural guidance was extended to exploration and development companies.

(8) Reclamation. Reclamation work continued on two surface mines operated by Novaco Limited in Springhill and Point Aconi.

Engineering Construction and Government Programs

This section reviews and inspects proposed municipal water and sewer and provincial agency projects to minimize the degradation and pollution of the environment.

During the year the section was involved in the following projects.

(1) Land Development. A total of 235 municipal subdivision applications were reviewed, and recommendations were made regarding the type of wells used, water quality erosion, and sediment control measures. In addition, drainage plans and road profiles were reviewed to minimize flooding problems.

Other large development proposals being assessed and monitored include the Aerotech Industrial Park near Halifax International Airport and the Ragged Lake Industrial Park near the just completed Halifax Winter Fair site.

Proposed provincial park sites at Long Lake and Dollar Lake, Halifax County, were assessed and approved.

(2) Review of Installations of Water and Sewer Services. This year 141 applications were processed. In addition, a total of $2.5 million was granted to assist municipalities in the construction of sewage collection and treatment works. This included a grant to the County of Halifax towards the cost of installation of the Lakeside/Timberlea collector treatment system.

The section conducted a sampling and analysis program to provide information on the effects of the discharge of raw sewage into the Halifax Harbour and to assist in determining future treatment strategies.

Within the past year, the City of Halifax made major changes in the City of Halifax mainland south sewage system that decreased overflows to MacIntosh Run. Further improvements are being studied.

(3) Highway Alignment and Utility Review. The Nova Scotia Department of Transportation submitted for approval a total of 21 separate projects involving approximately 250 km of highway alignment.

Approximately 160 km of new highway construction were monitored, and 20 Water Rights Applications were received.

Environmental Development

This section has three major areas of responsibilities. These include Pesticides Management, Environmental Review, and Environmental Studies. The major functions, duties, and activities during the fiscal year are briefly summarized as follows.

Pesticides Management. During the year 158 applications were received for the use of pesticides. From the total received, 131 were approved, 3 were recalled by the applicants, 3 were rejected, and 21 were not processed because of the lateness of the application. Permits were issued in the four major categories listed below.

(1) Forestry. Permits were issued for a total of 42 470 ha, consisting of 32 720 ha for insect control, 128 ha for forestry nurseries, 384 ha for site preparation, and 9 238 ha for conifer release.

(2) Industrial. Permits were issued for vegetation control and insect control for 2 110 ha and for wood preservation of 2 968 powerline poles.

(3) Municipal. Permits were issued to various cities and towns for insect control on shade and ornamental trees.

(4) Agriculture. Permits were issued for insect control, fungus control, and vegetation control in the agricultural sector. The total area covered under permit was 9 400 ha.

Environmental Review. This subject area encompasses activities conducted for the purpose of: baseline study design and implementation, environmental impact assessment, and environmental policy review and development. Major tasks carried out by staff members assigned to this area include:

(1) Coastal Erosion. A departmental policy was prepared on coastal erosion following a detailed examination of federal and provincial government mandates and programs for addressing this issue in Nova Scotia.

(2) Baseline and Environmental Monitoring Data Collection. A compilation of existing information and field data on the Bridgeport Basin area of Cape Breton County which was collected in 1983 and 1984, was published as *An Environmental Characterization of the Bridgeport Basin Watershed 1983-84.*

In order to develop surface water quality standards for the Waverley area of Halifax County, an environmental standards committee was formed with membership from the Waverley Ratepayers Association, Municipal Contracting Limited, Tidewater Construction Company Limited, and the Nova Scotia Department of the Environment. As the initial step in this exercise, the committee has initiated a monitoring program to establish the ambient water quality characteristics of the area.

(3) Environmental Impact Assessment. During the fiscal year 1984-85 the department continued to play a role in offshore environmental management for hydrocarbon development and in planning for

onshore developments. An assessment was completed of the environmental impact statement (EIS) submitted by Tidewater Construction Company Limited for a proposed quarry at Rocky Lake, Halifax County.

The department is co-chair of the federal-provincial Environmental Co-ordinating Committee that advises the Canada Oil and Gas Lands Administration (COGLA) on program approvals for offshore exploration and development. During 1984-85 the committee undertook a review of Mobil's preliminary Venture Development Plan and prepared an initial identification of issues associated with exploration on Georges Bank.

Staff of the department participate on three program study committees for the Environmental Studies Revolving Funds (ESRF).

During 1984-85 the study committees on which the province is represented undertook studies into fish tainting, the use of oil-based drilling muds, oil spills research, and strategies for public information and consultation.

The department is represented on the Offshore Co-ordinating Committee and co-chairs the Offshore Issue Group of the Deputy Ministers' Committee on Land Use. During 1984-85, the issue group evaluated the Report of the Sable Island Environmental Assessment Panel and the Venture Socio-Economic Review Panel. The issue group also prepared draft guidelines for construction camps and maintained ongoing liaison with offshore operators and pipeline proponents.

Environmental Studies. The appropriate resources data and study information are provided to assist in the examination and development of provincial environmental priorities and policies.

Currently the primary focus is acid rain, although development of offshore gas is becoming more important. There is also a need to respond to public concerns about surface water quality. One major response oriented effort during 1984-85 resulted from questions about the impacts of development on the water quality of Lake Echo, Halifax County.

During the year province wide water quality data were received from over 900 samples taken by the department or received from other

agencies such as the Department of Lands and Forests (300). More than 350 samples were obtained from five provincial precipitation monitoring stations located at Lake George, Yarmouth County; Ross Farm Museum, Lunenburg County; Cobequid Fish Hatchery; East River, St. Marys; and Cape North, Cape Breton. This includes additional water samples from 250 lakes. These samples provide important background data for the assessment of the effects of acid rain.

Water Resources Planning

The Water Resources Planning Section has two areas of responsibility: Water Resource Services and Water Resources Inventory.

Water Resource Services. Provides information and technical assistance to industry, municipal and other government agencies respecting the quality, quantity, use, development and protection of surface water and groundwater supply sources. Staff investigate actual and potential pollution problems to ensure the protection of water supplies. This includes the review of land uses and water supply development proposals. Table 6 gives an overview of written responses required from professional staff on various subjects. Program highlights during the year include:

(1) Water Quality Interpretation. Staff members provide water quality information, analysis interpretation, and remedial recommendations. During 1984-85, major time commitments were made to the investigation of tetrachloroethylene (perchloroethylene—PCE) contamination of well water in the New Minas and Truro municipal water supplies. Remedial measures have successfully rectified the situation in Truro. An alternate water source is being sought for the Village of New Minas.

Other investigations included interpretation of a water quality inventory of water supplies at Roberta, Inverness County; evaluation of groundwater monitoring analyses from landfills throughout the province; and well water contamination from de-icing salt, petroleum products, and farming activities.

(2) Water Supply Assessment. This includes assessments of existing water supplies and water resources potential, evaluation of quantity, testing, and processing of groundwater withdrawal applications. Assistance was provided to the Department of Government Services in planning the proposed school in Hilden, Colchester County, and on the augmentation of the water supply at the Nova Scotia Agricultural College.

With the near drought conditions of late 1984, many municipalities and institutions, as well as individuals, required advice on dwindling water supplies. Major staff involvement was required for the towns of Liverpool, Trenton, Oxford, and Digby; as well as Twin Oaks-Birches (a senior citizens home), Musquodoboit Harbour; the Lighthouse Co-op, Cape Sable Island, Shelburne County; College Ste. Anne, Digby County; the Roseway Hospital, Shelburne County; Miller Lake Subdivision, Halifax County; and Barton School, Digby County.

In addition, the Town of Amherst sought advice on a plan for relocation of their water supply as a result of an investigation of contamination.

(3) Review of Development Proposals. Staff members review the potential effects of proposals on water resources. Included are proposals for subdivisions, industries, mines, exploration, solid waste, highway alignments, etc. Major involvements during the 1984-85 fiscal year included:

- continued involvement with the Rio Algom tin mine at Kemptville, Yarmouth County, through the Tusket River Advisory Committee
- evaluation of offshore projects and pipeline proposals
- Highway 107, the Chezzetcook Salt Marsh Crossing
- landfills at St. Rose, Inverness County, and Swan Creek, Cumberland County.

(4) Research Development. The section initiates programs and provides constructive input into various government initiatives that contribute to efficient development and effective use of the water resources of the province. Major involvement during the 1984-85 fiscal year included:

- participation in the preparation of the departmental submission to the Pearse Inquiry on Federal Water Policy
- participation in the Canadian Council of Resource and Environment Ministers (CCREM) Task Force on Water Quality Guidelines

- continued involvement with the Well Drilling Advisory Board and the review of proposed new regulations under the Well Drilling Act

- participation in a workshop on groundwater and pesticides held by the Inland Waters Directorate in Dartmouth

- co-ordination of the Long Lake Watershed Monitoring Project undertaken by the Centre of Water Resources Studies, Technical University of Nova Scotia

- participation in the On-Site Sewage Disposal Research Panel set up by the Technical University of Nova Scotia

- continued membership in the Provincial Task Force on Uranium in Drinking Water

- participation in the Interdepartmental Committee to Adjudicate Government Action on the Recommendations of Judge McCleave's Uranium Inquiry Report

- preparation of three reports: *Water Resource Bibliography* (published); "Regional Water Resources, Sydney Coalfield" (in preparation); and "Well Water Quality and Treatment" (under review).

Water Resources Inventory. Basic information investigations of surface and groundwater was carried out to evaluate the provincial water resources both for protection and as a source of supply. Program highlights accomplished during the year included:

(1) Water Resources Monitoring Network Programs. Hydrometric network stations operated by the Inland Waters Directorate of Environment Canada gather data on the surface water at 52 sites under a federal-provincial cost-sharing agreement. Additionally, the Province of Nova Scotia maintains a network of 30 goundwater observation stations throughout the mainland, Cape Breton Island, and Sable Island, with records going back to 1965.

Efforts are now being made to incorporate water quality sampling under the program and to initiate a water supply forecasting system using data from groundwater network and the Atmospheric Environment Service, Environment Canada.

(2) Hydrological Network Review. An analysis of the provincial hydrometric and well-monitoring network was carried out jointly by the department and by Inland Waters Directorate, Environment Canada. The purpose was to evaluate existing use of and requirements for the data and to determine whether or not the network needs to be altered to provide more comprehensive coverage. The results of the analysis indicate that this information relates very closely to provincial development activities, which have an estimated value in excess of $670 million per year (see Table 2) in addition to the costs of water well construction which are estimated to be worth about $10 million per year.

(3) Water Resources Data Base Program. This program provides and develops a comprehensive data base and inventory of the groundwater and surface water resources in Nova Scotia, which encompasses both physical and chemical characteristics of these resources along with their availability for use.

Water Management

The water management section has two main program areas: the review of water rights and the responsibility for watershed management. Staff of this section issue approval permits for watercourse alteration, subject to government regulations and guidelines. They also recommend licences to allocate the withdrawal of water for individual, municipal, industrial, agricultural, and other uses. In addition, staff investigate complaints, recommend solutions, and enforce requirements under the Water Act. The section co-ordinates water use and watercourse alteration permits with appropriate provincial and federal agencies.

Another major function provided by this section is the regulation of activities around sources of water designated as protected water areas under Section 17 of the Water Act. Staff also assist in the resolution of land and water use conflicts and issues by working with landowners, water utilities, industry, and provincial departments in the development of regulations to protect water supplies.

(1) Permits and Licences. Requests are received from municipalities, industries, and individuals to use water or to alter watercourses. Four hundred and two water rights applications were received during the 1984-85 fiscal year. The section also received 135 applications to construct forest roads during the fiscal year, which required preconstruction site checks and construction monitoring.

(2) Complaints and Requests for Investigation. Some of the more common complaints handled by the section involve infilling of a watercourse, siltation of a watercourse, flooding, algae growth on lakes, gravel removal from watercourses, stream channels blocked with debris, and other similar matters. Staff worked on approximately 150 complaints and related investigations during the fiscal year.

(3) Designation of Municipal Watersheds and Water Resource Studies. At the end of the fiscal year there were 19 watersheds designated under Section 17 of the Water Act. There were no new designations during the year, but work continued on future designations.

The department provided financial and technical assistance for a watershed management study for the Town of Truro. Phase one of the study was completed during the fiscal year.

During the past year, staff from the Engineering Construction and Government Programs section and the Water Management section developed an erosion and sediment control manual. Draft copies have been distributed to several agencies, and it is hoped that a final manual will be prepared next year.

Staff assisted on the Erosion and Sediment Control Advisory Panel established by the Centre for Water Resource Studies at the Technical University of Nova Scotia.

Staff participate on the Flood Damage Reduction Technical Committee of the Canada-Nova Scotia Damage Reduction Program.

FIELD SERVICES DIVISION

The Field Services Division is responsible for conducting inspection and monitoring programs, by providing a wide range of investigative field activities as required by the department in support of environmental protection.

The division includes the following sections: Solid and Hazardous Waste Inspection, Air Quality Evaluation, Water Pollution Control, Water Well Management, and Watercourse Engineering and Maintenance. The responsibilities of these sections are outlined below.

Solid and Hazardous Waste Inspection

The Solid and Hazardous Waste Inspection section maintains a program for inspection and monitoring of municipal, industrial, and private solid waste disposal sites. The section is responsible for the inspection of areas contaminated by oil or hazardous material spills and undertakes supervision of the disposal of contaminated material. The section also reviews and appraises contingency planning with respect to accidents involving the handling and storage of petroleum products and offshore drilling exploration.

During the past year, the Solid and Hazardous Waste section responded to 170 spill reports. The number of reports received through the department's emergency reporting phone number has increased 50 per cent from the previous year.

The section was involved in a well control problem on the Scotian Shelf that was successfully brought under control without any releases of gas or condensate to the environment.

The solid waste disposal site groundwater monitoring program continued into its second year. Fifteen sites are included in the annual sampling program, which now includes tests for PCB and the dry cleaning fluid tetrachloroethylene (perchloroethylene-PCE).

In an effort to keep pace with the implementation of the Transportation and Dangerous Goods Act, most personnel in the regional offices have received training at the Federal Study Centre in Ottawa. The department has initiated a hazardous materials emergency response training program for fire, police, and municipal officials. Training was conducted in three regions of the province last year, with more training sessions planned.

Air Quality Evaluation

The Air Quality Evaluation section is primarily responsible for (1) gathering air quality data in various areas of the province; (2) measuring pollutants such as sulphur dioxide, nitrogen oxide, ozone, carbon monoxide, suspended particles, and radiation; (3) operating and maintaining ambient air monitoring networks; (4) handling complaints from the public concerning air, noise, odor, or related problems; (5) developing guidelines to assist industry in maintaining ambient air quality; (6) undertaking monitoring studies for existing or proposed industries; (7) assisting with stack emissions and testing of industrial sources.

Three major ambient air monitoring networks were operated during this period: the Sydney-Glace Bay area, the Strait of Canso area, and Halifax-Dartmouth. As well, a single monitoring site was operated in the Trenton area, and a temporary site was established at Albro Lake in Dartmouth at the request of the Dartmouth Board of Health. Twenty-five continuous monitors and 18 high-volume samples were operated.

Other major projects undertaken were:

- study of ferrous foundries
- study of odor problems at the Rothsay Meat Rendering Plant in Truro
- completion of the ambient air polynuclear aromatic hydrocarbons study (PAH), Sydney, Nova Scotia — a joint federal-provincial project. Report available from department.
- woodstove study in Truro and Sackville, in co-operation with Environment Canada
- development of a program to reduce the acid smut emissions from the Nova Scotia Power Corporation Tufts Cove Generating Station

Water Pollution Control Monitoring

The Water Pollution Control section monitors approved water pollution control facilities for effective and satisfactory operation so that these facilities can achieve required standards (see Table 5). The section

trains operators of these facilities and participates in several programs that promote voluntary certification of operators of wastewater treatment collection systems and treatment facilities, as well as water distribution and water treatment systems.

The section also investigates and responds to complaints related to water pollution and environmental degradation. Field staff are located in Middleton, Pictou, Port Hawkesbury, and Sydney.

In brief, highlights for the year include:

(1) McClure's Brook, Truro. An extensive investigation was udertaken into the problems of waste in McClure's Brook, Truro.

(2) Salmon River, Halifax County. In a major project on the Salmon River, Ross Road, Halifax County, 13 major problems were resolved in order to improve the fish habitat and to resolve burning and dumping practices in the area.

(3) Waste Water Treatment. Several investigations into loading and capacity of existing waste water treatment plants were undertaken in accordance with the department's policy on applications for expansion.

(4) South River, Antigonish County. The Port Hawkesbury office assisted in a salmon enhancement project on the South River in Antigonish County.

(5) Water Quality Surveys. Surveys were carried out on the Annapolis and Cornwallis Rivers.

Water Well Management

The Water Well Management section is responsible for the administration of the Well Drilling Act and associated enforcement and inspection activities. The Act requires that all well construction contractors operating in the province be licenced. A Well Drilling Advisory Board including representatives from the well drilling industry and several government departments advises the minister on matters pertaining to well drilling in the province.

In an effort to promote high standards of well construction, the section has been instrumental in arranging well drilling schools, conventions, and various technical courses over the past number of years.

The department is investigating the possibility of introducing a permit system for the construction of all water wells to reduce well construction problems as well as associated groundwater contamination problems. A review of the Well Drilling Act and Regulations was also completed during the year and several changes were proposed.

The well inspection staff reviewed 10 applications for well drilling licences during the year. Of these, eight were recommended for approval.

A number of complaints and inquiries under the Well Drilling Act were received and investigated. These involved construction problems including improper sealing of casings and faulty installation of pumps in both shallow and deep wells, contamination through road salt or gas or oil spills, and contamination attributable to natural conditions such as salt water intrusion near the coast or drainage of septic material through fractured bedrock. Complaints were resolved by staff without the necessity of charging any contractors under the Act. Two cases were reviewed by the Department of the Attorney General and later resolved.

The section also provided a supervisory service for major construction operations during the year, including provision of water supplies for several industries, institutions, and municipalities throughout the province.

Watercourse Engineering and Maintenance

The Watercourse Engineering and Maintenance section plans and implements environmental projects to modify the channels of freshwater streams to reduce property damage caused by erosion and flooding. Throughout the province, the section administers a cost-shared Streambank Stabilization Program and provincially funded Stream Maintenance Program. Staff members investigate erosion and flooding problems, provide reports and recommendations, and supervise works implemented for channel restoration, including channel reconstruction, gravel bar removal, and armor rock protection.

The section is also responsible for inspecting, maintaining, constructing, or removing provincially owned dams under the department's jurisdiction. During the year staff modified the fishway to the Conrod Lake Dam at Head of Chezzetcook, Halifax county. Staff also supervised the construction of the concrete dam, which incorporates a fishway, and the treated timber crib dam and fishway on the Tangier River at Mooseland, Halifax County.

During the year, 37 cost-shared streambank stabilization applications were received and investigated by staff. Nineteen of these sites were serviced (see Table 7). Thirteen sites on major rivers were identified for stream maintenance. Eight of these sites were approved under the program (see Table 7).

In addition to regular duties 1984-85, staff responded to a variety of regional inquiries and complaints. These included:

- foam in McClure's Brook, Colchester County
- silt in the Creamery Brook at Upper Brookfield, Colchester County
- fish kill in Lepper's Brook, Colchester County
- illegal garbage dumping in North River, Bass River, and Beaver Brook
- water pollution complaints at Campbell's Brook, Salmon River, Shubenacadie River, and Port Greville River

The section was responsible for the design and implementation of a number of projects:

Colchester County

(1) Salmon River, Dyke Construction. This flood control project was cost-shared by the Town of Truro, Village of Bible Hill, and the Nova Scotia Department of the Environment and involved the construction of dykes to protect residential properties on Riverside Avenue and Avon Street.

(2) McClure's Brook, Fish Kill Clean-Up. Several hundred dead fish were removed by hand from the section of brook from Halliday's Mill to the Truro Golf Club.

(3) Harrington River, Abutment Removal. To eliminate a source of ice jams and bank erosion, staff removed an old concrete abutment from the Harrington River.

(4) North River, Yellow Rocket Pulling. At the request of the Nova Scotia Department of Agriculture and Marketing, yellow rocket noxious weeds were removed from the banks of the North River.

Halifax County

(1) River Lake, Dam Construction. Staff negotiated with all property owners, the Eastern Shore Wildlife Association, and Fisheries and Oceans Canada to secure approval for water levels and fishway construction. Staff were also instrumental in the design of the new flow control structure and supervised its construction.

(2) Little Sackville River (DND). At the request of the Department of National Defense, staff designed and installed a number of erosion control measures on the rifle range property at Bedford.

Inverness County

(1) Skye River, Crib Removal. The department in conjunction with the Nova Scotia Department of Transportation shared the cost of removing a deteriorated timber crib breakwater on the Skye River immediately upstream of the Trans-Canada Highway bridge by the Whycocomagh Indian Reserve.

Pictou County

(1) West River Pictou. At the request of local landowners, a section of river channel spanning a number of properties was completely reconstructed to facilitate the passage of flood flows and ice and to protect prime agricultural land.

(2) The Ponds, Channel Opening. At the request of local residents, the department opened a small tidal pond at "The Ponds," Pictou County. The outlet became blocked with beach sand and gravel and created a flooding and odor problem for residents.

Richmond County

(1) L'Ardoise, Channel Opening. The department responded to complaints from area residents regarding flooding and odor related to blocked tidal ponds by designing and constructing a channel to St. Peter's Bay. The new channel allows daily flushing and reduced pond levels.

UTILITIES DIVISION

The Utilities Division is responsible for the operation and management of 13 provincially owned and maintained industrial water supplies and waste treatment facilities. The division is also responsible for identification and protection of potential industrial and municipal water supplies as directed by government and designs, installs, and recommends major renovations and alterations to meet objectives.

During the 1984-1985 fiscal year, 11 water supply stations, one domestic sewage treatment plant, and one industrial waste treatment facility were operated and maintained by the division.

The water pumping stations included saltwater supply plants at Grand Etang and Lockeport, and freshwater supply at Cheticamp, Port Hawkesbury, Canso, Pictou, Chester, Riverport, Lockeport, and Middle and Lower East Pubnico, and a treated freshwater supply system at Lockeport.

In addition, industrial waste from Scott Maritimes Limited in Pictou and domestic waste in the Town of Canso were treated.

A study was continued to remedy or alleviate the inadequate water availability in Cheticamp, and tenders were called for exploratory water well drilling.

ADMINISTRATION AND FINANCE DIVISION

The Administration and Finance Division provides executive management, administrative financial support, and central support sources to the three operations divisions of the department. These services are provided through four activity centres.

Office of the Minister and Deputy Minister. The office provides executive management to the department and liaison with municipal, provincial, and federal agencies and makes recommendations to the provincial Cabinet on environmental policies.

Offshore Oil and Gas Development Review. This activity provides a co-ordinated review of offshore oil and gas development. The program facilitates an environmental assessment of the potential impacts of major offshore developments. (See Environmental Assessment Division above for program details.)

Information and Education Services. This activity co-ordinates departmental liaison with the public and the media. The activity promotes a public awareness of environmental issues through an education program and provides a response to inquiries.

Administrative Support Services. The administrative and financial support functions, which this activity provides to the department, include accounting, personnel, central filing, central stationery and inventory control, as well as the day-to-day management of the operations of the office facility and its equipment. In addition, a specialized environmental library-research facility is maintained for use by educational institutions, consultants, industry, and other government agencies.

GENERAL

Nova Scotia Environmental Control Council

The Environmental Control Council is a 12- to 15-member citizens' advisory board, which provides advice to the Minister of the Environment and represents the interests of the environment and general public in resource decisions. Under the Environmental Protection Act, membership must include representation from the following disciplines: health, law, engineering, industry, labor, municipal government, conservation or ecology groups, agriculture, academic, forestry, and fisheries. The council is supported by an executive secretary and a research co-ordinator and includes the Deputy Minister of the Environment as an *ex-officio* member.

The Council offers annual awards to recognize outstanding environmental service in six categories: individual, group, organization, youth, government, and industry. Details about the Environmental Awards program, activities of the council and a copy of its annual report can be obtained by contacting:

The Executive Secretary
Nova Scotia Environmental Control Council
P.O. Box 2107
Halifax, Nova Scotia B3J 3B7
Telephone: (902) 424-5300

Advisory Groups

West Colchester Coastal Erosion Advisory Committee. This committee, established to advise the minister on the feasibility of an erosion control demonstration project, completed its task in late 1984 with the recommendation that a stone revetment be placed along a section of the Saint's Rest Shore, Colchester County. This project should be finalized before the end of 1985.

Sable Island Advisory Committee. The department participates on the committee to advise the federal Department of Transportation on environmental matters related to Sable Island.

Petite Riviere Watershed Advisory Group. The Petite Riviere Watershed Advisory Group was formed by the department in 1977 in response to a number of water related problems in the Petite Riviere system in Lunenburg County.

The purpose of the group is to advise the Province of Nova Scotia, through the department, the Town of Bridgewater, and the Municipality of the District of Lunenburg, on problems and solutions to water quality and flows in the watershed of Minamkeak Lake, Leipsigate Lake, Hebb Lake, Fancy Lake, and the Petite Riviere system.

Canada-Nova Scotia Flood Damage Reduction Program

This joint federal-provincial program is based on general agreements made in 1978 respecting flood damage. Two subsidiary agreements provide 50/50 cost-sharing for work to identify and prepare maps of flood-risk lands and to study remedies to flood damage problems. These agreements were extended this year to 1994.

The principal action to date for achieving reduced flood damage has been the acquisition and provision of information about the locations of flooding and the severity that can be expected. This information will enable home builders and buyers, commercial developers, and government agencies to prevent flood damage by avoiding risky areas or by taking appropriate precautions based on sound knowledge of the probable flood levels. Under this program to date three areas in the province, Antigonish, East River of Pictou County, and Sackville River, have been studied and mapped showing flood elevations.

During the past year hydraulic modelling studies and field surveys of the Salmon and North Rivers, Colchester County, have been conducted to allow preparation of flood-risk maps for lands in Truro and the county.

The program is supervised by a steering committee appointed by the provincial and federal ministers of the environment. Technical committees, consisting of representatives from several federal and provincial departments, oversee mapping and remedies studies, which are usually done under contract by consulting engineers. A joint federal-provincial public information committee is responsible for the devising publicity program.

Environmental Emergencies

The Nova Scotia Department of the Environment co-operates with all other provincial and federal departments to ensure a co-ordinated and integrated response to all oil or chemical spills. The department is responsible in all circumstances for designation of disposal sites and debris disposal procedures.

Grants Program

For the fiscal year 1984-85 grants totalling almost $1,937,666.40 went to various counties, towns and municipalities to assist in sewage, solid waste and water municipal services and studies. Included in these grants were:

- City of Halifax
- Town of Amherst
- Town of Berwick
- Town of Parrsboro
- Town of Stewiacke
- Municipality of the County of Colchester
- Municipality of the County of Halifax
- Metropolitan Authorities (Halifax, Dartmouth and Halifax Counties)

Meetings, Committees, Education, and Technical Seminars

Departmental staff were involved in a number of intragovernmental and interprovincial meetings and committees. This also included representation and presentation to educational and technical seminars, public interest groups, and various associations.

Departmental staff participated on the Atlantic Provinces-Petroleum Association Task Force on Leaking Underground Storage Tanks, which resulted in the development of workable interprovincial draft guidelines and regulations respecting underground tanks and procedures for leak cleanup.

Staff attended a hazardous material control course at College Station, Texas.

Participation in the Annapolis Tidal Power Intergovernmental Advisory Committee to monitor the effects of the tidal power plant construction was continued, and the department was represented on the Special Places Protection Act Advisory Committee.

Staff also participated in the Deputy Ministers' Committee on Land Use Policy, Land Development Standards Issue Group, to improve the roles of the various government departments in land subdivision and development. In addition, the department chaired the Water Issues Group, which is currently revising the role of provincial agencies regarding the protection of surface water, municipal water supply watersheds.

During the year staff attended several seminars in Halifax dealing with offshore and related issues. These included an introductory seminar on offshore operations sponsored by the Technical University of Nova Scotia, a seminar sponsored by Voluntary Planning on public participation and consultation, and a seminar on the effects of explosives use in the marine environment sponsored by the federal government.

During 1984-85 representatives of the department travelled to Louisiana, Texas, and New York to view onshore facilities for hydrocarbon development and to meet with industry officials.

Staff participated in negotiations for agreements respecting acid rain for the signature of New England Governors and Eastern Canadian Premiers (NEGECP) and Eastern Canadian environment ministers. The outcome was a resolution of the NEGECP calling for more determined action to stop acid rain and an agreement among environment ministers on a plan for abatement of sulphur dioxide by 1994.

Partcipation in other seminars, boards, and associations included:

- Atlantic Canada Section of the American Water Works Association
- Atlantic Water Well School at Moncton
- Atlantic Canada Chapter of the Air Pollution Control Association
- Interdepartmental Committee on Uranium
- Tidewater Monitoring Board
- Cobequid Park Development Board
- Land Resources Coordinating Committee of Voluntary Planning
- the Canadian Council of Resource and Environment Ministers (CCREM) meeting, St. John's, Newfoundland.

Public Information and Education Programs

A brochure, *Household Hazardous Waste,* was printed to instruct householders on the best method of disposing of hazardous products.

The department participated in the Atlantic Environment Ministers' education projects, including development and distribution of *Our Freshwater Resources* booklet. A brochure on the safe operation of wood stoves is near completion.

The department was involved in preparing news releases and distributing copies of the interpretive map on the Antigonish flood risk area under the Canada-Nova Scotia Flood Damage Reduction Program. Under the same program the department assisted in the production of a video on floods in Nova Scotia, which is due for release the following summer.

A display on acid precipitation was completed and will be used at fairs, exhibitions, schools, shopping malls, museums, and seminars.

"The Food Chain Kit" for elementary schools was repackaged and distributed to the department's regional offices. Upon request, speakers on various topics were arranged for a number of student groups.

The department also helped the Air Pollution Control Association (APCA) arrange a slide presentation.

An outdoor poster was developed and posted in strategic locations to inform the public of requirements for work in watercourses.

All approved herbicide spray permits were mailed to environmental groups, and numerous telephone and written inquiries were handled. The most frequent inquiry had to do with the herbicide Roundup (glyphosate) which was being used for the first time in this province by the forestry industry during the spray season.

Publications and Outside Contributions

Hinch, P. R., and J. K. Underwood. 1985. Chemical conditions and nutrients status of Lake Echo, Halifax County. Draft technical report, Nova Scotia Department of the Environment. 37 pp. + appendix.

Leydon, J. J. 1985. Environmental aspects of wood combustion and residue production. Paper presented at the Energy from Forest Residue Seminar at Acadia University, Wolfville, N.S., February. 12 pp.

_____. 1985. Mining effluents and the environment. Paper presented to francophone students at Dalhousie University, Halifax, July. 13 pp.

_____. 1985. Rio Algom's tin mine. *Newsletter* of the Association of Professional Engineers of Nova Scotia, March.

Schwartz, P. Y., and J. K. Underwood. 1985. Estimation of states of eutrophy of several Shubenacadie headwater lakes by comparison of phosphorus loading with Secchi transparency and oxygen depletion rates. In *The impacts of past gold mining activities on the Shubenacadie River headwaters ecosystem,* ed. A. Mudrock and T. V. Clair, 68-106. Canada report no. IWD-AR-WQB-85-81. Moncton.

Underwood, J. K., and J. G. Ogden III. 1985. A lightweight near shore water sampler. *Journal of Freshwater Ecology* 3(2):189-91.

Underwood, J. K., J. G. Ogden III, H. H. Vaughan, and J. J. Kerekes. 1985 Acidification of Nova Scotia Lakes III: Atmospheric deposition of SO_4 and NO_3 and effects on rural and urban lakes. Article submitted to *Water, Air and Soil Pollution.*

Underwood, J. K., D. H. Waller, and D. Thirumurthi. 1984. The influence of the ocean on the chemistry of precipitation in Nova Scotia. Paper presented at the Canadian Hydrology Symposium at Laval University, Quebec. Proceedings to be published.

Table 1: Written Responses[1] — Water Resources

Subject	1983-84	1984-85
Water quality (General)	114	227
Water supply (general)	62	100
Pump test evaluations	14	10
Water rights withdrawal	11	6
Reviews		
Subdivisions	36	6
Solid Waste	20	16
Industrial	12	20
Highway alignment	9	5
Drainage	6	5
Research and development	35	63
Miscellaneous	2	0
TOTAL	321	458

[1] Table 1 is an overview of written responses required from professional staff on various subjects.

Table 2: Hydrometric Network Data User Survey

Type of User	Value ($1,000/yr)	Response Ratio[1]	Response %
Private concerns	$ 123,490	14/26	54
Civil and municipal governments	2,675	11/30	44
Federal and provincial governments	551,650[2]	6/15	40
TOTAL:	$ 677,815	31/71	44

[1]Number responding/total respondents
[2]Approximately $550,000,000 of this is used for hydroelectric power generation

Table 3: Air Pollution Monitoring Facilities, Nova Scotia

Location	# Sites
Halifax	
Sulphur dioxide	4
Nitrogen dioxide	2
Ozone	2
Carbon monoxide	1
Total suspended particulate	6
Sydney	
Sulphur dioxidee	8
Total suspended particulate	7
Strait of Canso	
Sulphur dioxide	5
Hydrogen sulphide	2
Total suspended particulate	4
Trenton	
Sulphur dioxide	1
Total suspended particulate	1

Table 4: Air Pollution Inquiries

Type of Complaints	Number of Complaints
Hospital	13
Thermal power	16
Oil refining	13
Pulp and paper	1
Foundries	31
Salvage operations	18
Open burning	13
Odor	19
Noise	7
Miscellaneous	63
General inquiries	40
	234

Table 5: Water Pollution Control Facilities, Nova Scotia

County	Municipal	Industrial	Total
Annapolis	8	2	10
Antigonish	9	0	9
Cape Breton	19	9	28
Colchester	16	3	19
Cumberland	19	2	21
Digby	9	0	9
Guysborough	9	0	9
Halifax	71[1]	9	80[1]
Hants	21	0	21
Inverness	20	0	20
Kings	14	3	17
Lunenburg	27	2	29
Pictou	18	2	20
Queens	9	0	9
Richmond	7	5	12
Shelburne	9	0	9
Victoria	11	1	12
Yarmouth	10	1	11
TOTAL	306	39	345

All waste treatment facilities are monitored on a regular basis.

[1] The County of Halifax completed the Lakeside/Timberlea Wastewater Treatment Plant (5 MGD). The bringing on line of this plant eliminated about 15 poorly operated small facilities and provided municipal services to a large area.

Table 6: Water Well Drilling in Nova Scotia, 1984

Wells Drilled	
Observation	5
Industrial	25
Public	12
Domestic	2,958
Equipment in full- or part-time use	
Cable	37
Rotary	40
Backhoe	39
Jetting	2
Diamond	NIL
Workers employed, full- or part-time	230
Pump tests assisted	13
Accidents, including diamond drilling	
Fatal	0
Compensable	5
Licences issued	
Drilling machine	79
Backhoe	38
Complaints and Written Inquiries	
Complaints	66
Inquiries	202
Water Samples	
Well and stream	190

Table 7: Stream Bank Protection and Maintenance Program

STREAMBANK PROTECTION COST-SHARED PROJECTS (Armour Stone)		STREAM MAINTENANCE PROVINCIAL PROJECT NO COST SHARING	
County & Applicant	**Watercourse**	**County & Site**	**Watercourse**
Antigonish County		*Colchester County*	
Kevin DeWolfe	James River	Peter Berkelaar	Chiganois River
Beverly MacPherson	South River trib.	Site 1 and 2	Debert River
Bill Garvie	West River	Leon Miller	Stewiacke River
		Island Site	Stewiacke River
		Nason-Kennedy	Stewiacke River
		Meadowvale	Stewiacke River
		Groin Site	Salmon River
Colchester County			
Steve Yuill	Gays River		
Roy Geddes	Goshen Brook		
Doug Taylor	Little River		
Fred Canning	Newton Brook		
Keith Johnson	Newton Brook		

Rita Farrell	Salmon River
Lambert Vissers	Shubenacadie River
Leon Miller	Stewiacke River
Horst Soehl	Stewiacke River
Doug Taylor	Stewiacke River
Alan Campbell	Stewiacke River trib.

Halifax County

Earle Burton	Cooks Brook
Steven Streatch	Musquodoboit River

Victoria County

John A. MacDonald	Indian Brook
John A. MacDonald	Middle River
James E. Taylor	MacLean Brook